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ABSTRACT

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ORGANIZATIONAL CONTROL

IN UNIVERSITY DEPARTMENTS

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Abstract

The control structures of 37 academic departments at the University of Illinois were characterized in terms of a) the total amount of control in the department, and b) the distribution of control among tenured and nontenured faculty members. A consistent pattern of interaction effects of total control and distribution of control on departmental and individual outputs was found. In departments in which control was distributed in an hierarchical fashion (i.e., tenured faculty members had more control in the department than nontenured faculty members), a negative relationship occurred between total control in the department and output. This negative relationship is contrary to the positive relationship typically found in other organizations. There was no significant relationship between total control and output in departments in which the distribution of control was egalitarian.

ORGANIZATIONAL CONTROL IN UNIVERSITY DEPARTMENTS[1]

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The study of organizations had led social scientists to a variety of settings, ranging from leagues of women voters to pajama factories, from hospitals to military organizations. One organization which has been left largely untouched by the systematic observational techniques of social scientists is the university. What Caplow and McGee (1958) stated twelve years ago is still quite true today: "The methods of social research have been applied by university professors to every important American institution except their own."

This observation was reinforced in a recent bibliographical survey of the literature on the administration of higher education by Betsy Ann Olive (1967). Her conclusion was that although there was a large literature on the administration of higher education, very little of it was based on empirical research.

There are two major reasons that research on universities is important. The first reason is the theoretical interest of universities as organizations. Universities are provocative specimens of social organizations, very much unlike other types of organizations. One important question, therefore, is whether other organizational theories are applicable to the university. There are at least three arguments which cast doubt on this possibility: 1) the goals of universities are not

specific or clearly defined; 2) the products and services of universities are not tangible; 3) the consumer (student) exerts little influence on the organization; and 4) the decision making process in universities is diffused, as opposed to the formal authority hierarchies which typically characterize manufacturing organizations.

The second reason that research in universities is important is the practical one. With increased emphasis on higher education in our society, coupled with a rapid population growth, university enrollments have risen sharply, and increasing numbers of people are pursuing their education beyond the baccalaureate to the masters and doctoral level. This places a heavy burden on university academic departments to provide high quality education at high levels, while maintaining a suitable atmosphere for high quality research and scholarly work by the faculty.

The present study focused on university academic departments as organizations. In particular, the study was designed to investigate one important aspect of the organization of university departments, namely the process of control. By definition, an organization limits and constrains the behavior of its individual members. This process of control is necessary for orderly functioning and goal achievement within the organization.

Recent theoretical and empirical analysis of the control structure of organizations has been conducted by Tannenbaum and his associates (c.f., Tannenbaum, 1968). Among the innovations of the work of Tannenbaum was the idea that the amount of control in an organization is a variable quantity, which was contrary to the traditional assumption that power in a social system is a fixed quantity. Under the fixed quantity assumption, leaders and followers in the organization engage in a "zero sum game" competing for the

available control. An implication of the fixed quantity assumption is that in order to involve the rank-and-file members of an organization in the decision making process, managers must necessarily relinquish some of their control. Among the first to question the fixed quantity assumption were Tannenbaum and Kahn (1958). They argued that there is a variable amount of control in organizations, and that the total amount of control can vary both across different organizations and within the same organization at different periods of time.

Tannenbaum (1968) has argued that control within an organization can be increased internally by changing structural conditions so that interaction and influence among members are expedited and by increasing the motivation of organizational members through their own involvement in decision making. Participation by rank-and-file members in the decision making process should increase their stake in the decisions and therefore increase their motivation to achieve the goals of the organization (Tannenbaum and Bachman, 1964).

The concept of total control in an organization is related to the "organic" versus the "mechanistic" conceptualizations of Burns and Stalker (1961). An organic system is characterized by knowledge of the overall task structure of the organization by all members and by a highly coordinated response of the organization to changes, which implies a high degree of control by and over organization members. A mechanistic system, on the other hand is characterized by a tall hierarchy of authority and specialization of subtasks, where responsibility for the relevance of subtasks rests at the top of the organization. Within this type of system, then, there is less total control in the organization than under an organic system.

As a technique for representing various aspects of the control structure of organizations, Tannenbaum (1956; Tannenbaum and Gerogopoulos, 1957) developed the "control graph." A "control graph" is a graphic representation of the amount of control exercised by each of several hierarchical levels within the organization. It is constructed by plotting descending hierarchical levels along the abscissa versus the amount of control exercised by each level along the ordinate. The amount of control exercised at each level is typically measured by asking members of the organization to rate on a five point scale the amount of say or influence each hierarchical level has over what goes on in the organization. The control exercised by each level is then simply the mean rating for that level.

A control graph yields two types of information about the control structure of an organization. First, the total control in the organization is represented by the height of the control curve. Secondly, distribution of control among various levels of the organization is represented by the slope of the control curve. Thus, a "flat" control curve would represent an organization in which control is equally distributed among different levels of the organization, while a positively or negatively sloped curve would represent an organization in which control is distributed unequally among organizational levels.

The first investigation employing the control graph technique was a study of four union locals (Tannenbaum, 1956). In these union locals control was measured at four levels: the president, the executive board, the plant bargaining committee, and the rank-and-file membership. The results showed that the degree of member participation in union affairs (including meeting attendance, raising and seconding motions, working on committees, voting in union elections, etc.) was positively related both to the total amount of

control in the local and to the degree of democratic control in the local (measured by the degree of positive slope of the control curve). Furthermore, there was a positive relationship between the amount of democratic control and union interest in broad general social goals, as opposed to immediate bread-and-butter goals. Finally, the total amount of control in the local was positively related to loyalty of members, conformity to group norms, and to the amount of union-management conflict.

A later study (Tannenbaum, 1961) was designed to test two propositions relating control structure of the organization to effectiveness. The first hypothesis was that organization effectiveness would be positively related to the degree of positive slope of the control graph (i.e., the degree to which the distribution of control was democratic). This hypothesis was developed from two lines of reasoning. First, having say in the organization may tend to move the organization in directions which satisfy the needs of rank-and-file members. Secondly, control by lower echelons would lead to greater acceptance of jointly made decisions and would increase the felt responsibility for those decisions. These two influences would lead to greater effectiveness in the organization under democratic control.

The second hypothesis tested by Tannenbaum (1961) was that organizational effectiveness would be positively related to the total amount of control in the organization, because greater control would lead to greater coordination of effort in a goal-related direction.

The study was conducted on 104 local leagues of women voters. Within each league, control was measured at 3 levels: the president, a board of directors, and the rank-and-file. The effectiveness of each league was rated by up to 29 persons from the national headquarters. The results showed

significant positive relationships between slope of the control curve and effectiveness and between total control and effectivaness of the league (correlations of .31 and .29 respectively). Furthermore, slope and total control were virtually uncorrelated (.14), so their effects on league effectiveness were largely independent. That is, using both slope and total control to predict effectiveness produced a multiple-R of .42.

Smith and Tannenbaum (1963) did a comparative analysis of the control structures of different types of organizations. Their analysis attacked three major problems: 1) a comparison of the control graphs of different types of organizations; 2) exploration of differences between officers' and members' actual control and ideal control and how these differences vary from organization to organization; and 3) comparison of the relationships between aspects of control structure and effectiveness in various organizations. Among the organizations studied were 32 stations of a delivery company, 36 auto dealerships, a manufacturing plant, 2 power plants, 104 leagues of women voters, and 5 union locals. A number of interesting results emerged from this study. First, all business organizations had a negatively sloped control graph, that is, control was higher at higher levels of the organization than at lower levels. Furthermore, the ideal slope for members and managers was positive for voluntary organizations and negative for business organizations. The total amount of control in the organization was found to be positively related to effectiveness in the voluntary association, in union locals, and in the delivery company, but there was no relationship between total control and effectiveness in the auto sales firms. One reason for the lack of positive relationship between total control and effectiveness in auto dealerships may be that performance is not dependent upon coordination but rather on independent individual performance. Finally, the slope of the control

graph was found to be positively correlated with performance only for the voluntary organizations. There was no relationship between slope and performance in the other organizations.

These findings are interpreted as confirming the notion that high total control is associated with an organization in which there is a high degree of interaction and influence within and between hierarchical levels, leading to more efficient task activity and more motivation on the part of individuals within the organization.

Although the research of Tannenbaum and his associates has taken place in a number of organizational settings, very little empirical research has been done on the control structure of university departments, probably for many of the reasons outlined above.

A recent study by Harrison (1970) bears somewhat on the question of control structures in universities. This study was designed to test the effects of "organic" versus "mechanistic" systems of control on the rated performance of research laboratories. The study was based in part on the theoretical work of Burns and Stalker (1961) which resulted in the prediction that the more organic the organization, the higher would be the perceived role performance of researchers in the lab.

A number of indicator variables, including participation in organizational decision making,were used to assess the position of each of the three labs studied on a dimension of "organic" vs. "mechanistic" organization. The results of the study confirmed the hypothesis in that the more "organic" the system, the greater the perceived performance of the lab on three of the four measures of perceived role performance. Since "organic" orientation implies a high degree of total control in the organization, these results can

be seen as being in accord with the general findings of Tannenbaum.

Using the control graph technique, Hill and French (1967) measured the control exercised by five groups in a university setting. The five groups were the board of trustees, higher administrators, deans, department chairmen, and professors. As was expected, the control graph was relatively flat; that is, department heads and professors were seen as having almost as much control over what goes on in the department as the deans and higher administrators. These results are not surprising given the common lore about the relative independence of university departments from one another and from higher administration within the university. It would seem reasonable, then, that a study of control in university departments should focus on the distribution of control and the total amount of control within the department.

In light of these results, the present study was undertaken to analyze the effects of control structure within university academic departments on productivity and satisfaction of departmental faculty members. Because university departments do not have formally designated management hierarchies, which typify other types of organizations, it was decided to split departmental faculty members into two groups, tenured faculty and nontenured faculty.

There are several obvious differences between these two groups. Primarily, tenured faculty members are those individual who have been in the department, or at least in the profession, for a number of years, who have relatively stable positions within the department, and who are commonly considered the "leaders" in the department (in an expert and referent sense). Nontenured faculty, on the other hand, are primarily recent Ph.D.'s who are just starting their careers, and who are normally considered to have less influence in the department than tenured faculty.

"Control structure" for the present study, then, refers to the distribution of control among tenured and nontenured faculty members and the total amount of control exercised by both groups.

With respect to the distribution of control among tenured and nontenured faculty members, two departmental prototypes were defined. One was the department in which the distribution of control among tenured and nontenured faculty was egalitarian. In departments of this type, nontenured faculty members exercised nearly as much control as tenured faculty members in the department. The second type of department was defined as an hierarchical department, in which the control exercised by tenured faculty was considerably greater than the control exercised by nontenured faculty.

Total control in the department referred to the sum of the control exercised by tenured faculty and the control exercised by nontenured faculty. The control structure of a department was then defined as its joint classification into egalitarian vs. hierarchical distribution of control and high vs. low total control.

Six hypotheses for the present study were derived from the previous work of Tannenbaum and his associates on the control structure of organizations (c.f., Tannenbaum, 1968). Hypotheses 1 and 2 followed almost directly from the results of these studies.

Hypothesis 1. Departmental outputs will be positively related to the degree to which the distribution of control in the department is egalitarian.

Hypothesis 2. Departmental outputs will be positively related to the total amount of control exercised by faculty members in the department.

One criticism that can be made of previous research on control structure is that each variable, total control and distribution of control, has been

correlated with productivity and satisfaction. This procedure is suitable for investigating main effects of these two factors on productivity, but it precludes the possibility of detecting interaction effects of the two aspects of control structure. In discussing the results of his study of leagues of women voters, Tannenbaum (1961) hints at the possibility of interaction effects of total control and distribution of control, but the author could find no subsequent study in which this possibility was examined by an appropriate statistical design. Furthermore, it seemed that an interaction effect of these two variables on productivity would not be unreasonable. For example, an oligarchic department may require a great deal of total control to maintain order and coordination of effort because of low involvement and motivation at lower levels. In democratic departments, on the other hand, nontenured faculty participate more in decision making and hence would be expected to have higher motivation and loyalty. Here it may be that less total control is needed for effective operation.

One additional variable which may be expected to interact with aspects of control structure in determining output is departmental size. For example, a greater amount of total control may be needed to maintain coordination of effort in large departments than in small departments. From these and the above considerations, the following hypothesis was derived for the present study:

Hypothesis 3. There will be interaction effects of total control and distribution of control on departmental output as well as interaction effects of department size and control structure on departmental performance.

The next three hypotheses are similar to the first three and apply to the relationships between control structure and faculty satisfaction.

Hypothesis 4. Faculty satisfaction in the department will be positively related to the degree to which the distribution of control in the department is egalitarian.

Hypothesis 5. Faculty satisfaction in the department will be positively related to the total amount of control exercised by tenured and nontenured faculty members in the department.

Hypothesis 6. There will be interaction effects of total control and distribution of control on faculty satisfaction in the department as well as interaction effects of department size and control structure on departmental satisfaction.

Method

The Setting

This study was conducted as part of a larger study at the University of Illinois, Urbana campus starting in the Spring of 1968. The University of Illinois is a large state-supported, land-grant institution, with a heavy emphasis on research and graduate education. The Urbana campus has an annual enrollment of approximately 32,000 undergraduate, graduate, and professional students, with an academic faculty exceeding 3,000 in number.

An initial sample of 56 academic departments was selected for inclusion in the study. Only departments which offered graduate programs leading to the Ph.D. degree or its equivalent were selected for the study. This limitation was imposed because one of the objectives of the overall project was to investigate factors related to the effectiveness of graduate education in university departments. The executive officer of each department was contacted and interviewed in order to explain the purposes of the study and

to obtain cooperation of the department in the study.

Sources of Data

The data for this study came from four sources: an extensive questionnaire completed by faculty members, archival records of the University of Illinois Bureau of Institutional Research, a pamphlet distributed annually by the University of Illinois entitled Publications of the Faculty, and additional ratings made by selected faculty members. Webb, Campbell, Schwartz, and Sechrest (1966) point out the necessity of utilizing different sources of data in a field study in order to avoid the possibility of having the same sources of error in all measures used in the study. The fact that a number of "unobtrusive" measures were used should strengthen the present study.

The Questionnaire. In the spring of 1968, a questionnaire was distributed to all faculty members with rank instructor or abovein 56 academic departments at the University of Illinois. Three or four weeks after distribution of the questionnaire, a follow-up letter was sent to all faculty members who had not yet returned the questionnaire. After an additional two weeks, a telephone follow-up was conducted in an attempt to entice nonrespondents to return the questionnaire. The cooperation of departments in the study varied greatly from department to department. The departmental return rates on the questionnaire ranged from 19% to 100%. The overall return rate was about 54%.

The relatively low return rate immediately raised the question of the selectivity of the sample of faculty members who did respond to the questionnaire. One test of the representativeness of the sample of respondents was available through a comparison of respondents and nonrespondents on five variables obtained through the University of Illinois Bureau of Institutional

Research. These data were concerned with various aspects of the formal appointment of each faculty member in the department and with characteristics of each faculty member. The variables were academic rank, highest degree earned, total university Full Time Equivalent (FTE), percent appointment in the department, and Full Time Equivalent on Teaching. These data were entered into a three-way classification defined by the following three factors: (1) response condition: respondent vs. nonrespondent; (2) appointment in a department with a high response rate vs. appointment in a department with a low response rate; and (3) academic area, defined by hard sciences, soft sciences, and humanities. A three-way analysis of variance was applied to each variable, and the results indicated a significant relationship beyond the .05 level of probability between response condition (respondent vs. nonrespondent) and four of the five variables. The only variable not significantly related to response condition was academic rank. For the other four variables, respondents were significantly higher than nonrespondents. Thus, respondents had more advanced degrees, had higher total appointments in the university, had higher appointments in the department, and had higher Full Time Equivalent teaching appointments than nonrespondents.

In addition to the main effects of response condition, there were also significant interactions between academic area and response condition on these four variables. Examination of the cell means for these interactions indicated that the differences between respondents and nonrespondents were in the same direction for all three academic areas, but the differences were most pronounced for soft sciences and least pronounced for humanities.

At first glance, these results were distressing in their implications for the representativeness of those who responded to the questionnaire.

However, these analyses were conducted on data from 884 faculty members. With such a large sample, small differences would be statistically reliable. Estimates of the proportion of variance of each variable accounted for by the respondent-nonrespondent factor were computed, and the largest was 2.2%, with the smallest being 0.7%. These differences are so small that they should be of little consequence for the question of the representativeness of the sample of respondents.

However, it was still considered necessary to eliminate some of the departments with very low response rates from further analyses. Since questionnaire responses were used to measure department-level concepts, it was necessary that respondents from each department be as representative of the department as possible. For this reason, departments with a return rate of less than 40% were dropped from further analysis. This left 37 departments with response rates of at least 40%, which comprised the sample for this study.

Two sets of variables relevant to the present study were measured by the questionnaire. The first was a measure of the control structure of each department. Tannenbaum (1968) defined control as any process by which the behavior of an individual or group of individuals is intentionally affected by another person or group of persons. It seems reasonable to argue, then, that one means of exercising control in a university department would be to participate in the administrative and decision making process within the department. In describing the concept of control, Tannenbaum (c.f., 1968, p. 10) repeatedly referred to participation by members of the organization in the

decision making process. Thus, a measure of participation by members of the organization in organizational administration and decision making should be a reasonable measure of control in the organization.

For the present study, the following question was used to measure the amount of control exercised by each faculty member in the department: "How would you rate your own participation in departmental administration and decision-making?" Responses were made on an eight point scale ranging from "very little participation" to "a great deal of participation." Some support for the validity of this measure as a measure of the control process was reported by DeVries (1970) in another phase of this project. He found that individual responses to this item correlated positively with FTE administration (the proportion of a faculty member's contract which is paid for administrative work), with the value the individual placed on administrative work, and with the proportion of time the individual spent on administrative work. Thus, individual ratings of participation in administration and decision making appear to be valid indicators of the degree to which the individual is involved in the control process in the department.

The two aspects of departmental control structure, total control and distribution of control, were measured as follows: For each department, the average response to this item was computed separately for tenured faculty and for nontenured faculty. Total control in the department was taken as the sum of these two means, that is, the sum of the average control exercised by nontenured faculty and the average control exercised by tenured faculty. Distribution of control in the department was measured as the slope of the the departmental control graph, with tenured faculty and nontenured faculty as the two groups. The slope of the graph was computed simply as average control

for nontenured faculty minus average control for tenured faculty. As has been the case in most of the previous work on control structure (c.f., Smith and Tannenbaum, 1963), the slopes of the departmental control graphs were predominantly negative (ly three departments had a positive slope). The slope of the control graph provided an index of the degree to which control was equally distributed among tenured faculty and nontenured faculty (i.e., a zero slope) reflecting an egalitarian distribution of control, versus unequally distributed, with more control exercised by tenured faculty than nontenured faculty (i.e., a negative slope), reflecting an hierarchical distribution of control.

The control structure of a department was then defined as the joint classification of the department into high vs. low total control and high vs. low positive slope of the control graph (egalitarian vs. hierarchical departments, respectively). Both total control and slope of the control graph were dichotomized at the mean of the distribution. This provided a 2x2 classification of departments on the basis of control structure. This 2x2 classification was further broken down by department size, large vs. small, resulting in a 2x2x2 classification. The design and the number of departments classified into each cell of the design are presented in Figure 1.

Insert Figure 1 about here

Faculty satisfaction was measured by responses to seven items on the questionnaire requesting faculty members to indicate the degree to which they are satisfied with each of the following aspects of their job situation: organization of administrative functions in the department, personal relations

Small Departments

Total Control	Slope of Control Graph: low	Slope of Control Graph: high
high	N=5	N=4
low	N=7	N=4

Large Departments

Total Control	Slope of Control Graph: low	Slope of Control Graph: high
high	N=4	N=3
low	N=5	N=5

Figure 1. Statistical design for control structure analyses.

with colleagues, present position, progress toward personal goals, and present job in light of career expectations. Each satisfaction rating was made on an eight point scale ranging from "very satisfied" to "not at all satisfied."

Publications of the Faculty. Each year, the University of Illinois releases a pamphlet entitled Publications of the Faculty. This pamphlet lists for each faculty member of the University of Illinois all of his publications for the previous year. Publications listed include journal articles, books, book reviews, and technical reports. Also included in the listings are doctoral dissertations which were chaired by each faculty member. Much of the output data for the present study was taken from this pamphlet.

For each faculty member the numbers of each of the following outputs over the five year period from 1964-1968 were tallied: textbooks, monographs, professional journal articles, technical reports, book reviews, and "other" publications, as well as the number of dissertations chaired. The category "other" publications contained primarily edited books, with the inclusion of a very few published poems and short stories. For each department, the total number of each of these seven categories of outputs was computed for the five year period. For the thirty-seven departments included in this study, this data represented over 1400 faculty members.

Quality of Journals. As a measure of the quality of research output, an index was derived for this study entitled the Quality of Journals Index (QJI). Because of the very large numbers of journal articles published by faculty members in the sample over the five year period, it was considered prohibitively costly and time-consuming to have each article rated as to its quality. Thus, the following procedure was adopted: It was assumed that within

any academic discipline, the various journals available for publishing articles in that field each have some minimum editorial standard of excellence for accepting an article for publication. Furthermore, it was assumed that this minimum standard varies from journal to journal. With these assumptions, we were able to develop an index of quality of journal articles based on the rated quality of journals in which articles were published.

To obtain ratings of all journals within each field, lists were first compiled of all journals in which faculty members in each field had published articles during the years 1964-1968. Then the executive officer of each department was contacted and was requested to supply the names of five or six faculty members from his department, whom he considered knowledgeable in the field, and who represented the various subdisciplines in the field.

These faculty members were then sent a questionnaire with a cover letter signed by an associate dean of the Graduate College at the University of Illinois. The questionnaire contained a list of all journals in which faculty members in the field had published articles during the years 1964-1968. The respondent was requested to rate each journal on a five point scale as to its quality. The ratings of quality ranged from "excellent" to "poor". If a judge were unacquainted with a particular journal, he was requested to indicate so and not to rate the journal. After a telephone follow-up, a 91% return rate was obtained on this questionnaire.

A quality score was computed for each journal by assigning numerical values of 1 to 5 to the five quality categories and then taking an average of the ratings for that journal. Given these journal quality scores, a quality of journal articles score for each department was constructed in the

following manner: For each journal article published by faculty members in the department, the journal in which it was published was noted, and the quality rating of that journal was recorded. Because of the obscurity of some of the journals, there were no ratings available for these journals. The number of articles published in unrated journals, however, turned out to be a very small proportion (10%) of all of the articles published, so these articles were dropped for the calculation of quality. The quality ratings for all articles in the department were then summed and the total was divided by the number of articles entering into the total. The resulting number was the Quality of Journals Index for the department. An interrater reliability estimate for the Quality of Journals Index was obtained by determining the median interjudge correlation among ratings across journals within each area. The median interrater correlation across areas was .484.

Quality of First Jobs. One of the primary functions of a graduate department is to procure Ph.D.'s who are well-educated, competent scholars. An index was derived for this study, which was designed to assess the degree to which a department was successful in meeting this goal. The index, called the First Job Index (FJI), outlined in detail by Fiedler and Biglan (1969), is based on ratings of the quality of first jobs obtained by graduating Ph.D.'s from the department. Several assumptions were necessary in constructing this index. First, it was assumed that a graduating Ph.D. will seek and accept the best possible job that he can obtain. Furthermore, it was assumed that university departments seeking new candidates for positions will accept the most qualified candidate who has applied for a position. With these assumptions, it is reasonable to conclude that on the average, the

most qualified candidates will go to the best institutions, and the least qualified candidates will obtain lesser quality jobs. The FJI, then, was obtained by having faculty members rate the quality of first jobs obtained by recent graduating Ph.D.'s.

Specifically, lists were obtained from the files of each department of the first jobs obtained by graduating Ph.D.'s from the years 1964-1967. These lists were then sent to about six faculty members from each department who had been nominated by the departmental executive officer. The judges were required to rate each job as to its desirability as a first position for a graduating Ph.D. from the department. Names of the students who had obtained the jobs were not included with the lists of jobs. Furthermore, only positions obtained by males in the United States were included, since females are more likely to be influenced by where their husbands go than by the desirability of availble jobs. Also, it was assumed that raters would not be sufficiently familiar with foreign jobs to rate their desirability.

Ratings of job desirability were made on a scale ranging from "very desirable" to "very undesirable." To compute the FJI for a department, the average rating of each job was computed, and then the job ratings were averaged to give an overall index.

An obvious problem with this index is the possibility that faculty members at the University of Illinois might have a tendency to rate the quality of jobs obtained by their own alumni as being higher than would "unbiased" raters. To check for this possibility, the lists of jobs from six of the departments in the sample were rated by six faculty members in each of the corresponding six departments at the University of Washington. T-tests indicated that the average ratings made by University of Washington

faculty members did not differ significantly from the ratings made at the University of Illinois. Furthermore, the ratings made by Washington faculty were consistently higher (again, not significantly so) than the ratings made at Illinois. Thus it appears that a "bias" was not operating in the ratings made at Illinois.

In addition, for each of the six departments, the ratings made at the two institutions were correlated across jobs within each department. The median of the six correlations was .75, indicating that the First Job Index has satisfactory interinstitutional reliability.

Analysis of the Data

For all statistical analyses involving the control structure of departments, departmental scores on the dependent variables were classified into the eight cells of the statistical design described above. Since the number of departments was not equal or proportional across cells of the design, an unweighted means analysis of variance was applied to the variables being analyzed. This analysis allowed for tests of both main effects of total control and distribution of control, and interactions between these two factors and department size.

Results

Reliability of the Control Measures

Because the measures of total control and distribution of control were key measures for the present study, it was considered essential to evaluate the reliability of these measures. A split-half procedure was employed. For each department the tenured faculty and nontenured faculty were randomly split into two groups. The average control scores were then computed

separately for each of the two groups of tenured faculty and nontenured faculty. Then two estimates of total control and slope of the control graph were computed for each department by combining the data for the two subjects of the tenured faculty and nontenured faculty in the appropriate manner. These two estimates of each control measure was then correlated across departments, and the correlations were corrected for test length by the Spearman-Brown formula. The resulting reliability estimates were .61 and .68 for total control and slope of the control graph respectively. While these estimates were somewhat low, the two measures were considered sufficiently reliable to warrant further analysis.

Tests of the Major Hypotheses

Hypotheses 1, 2, and 3. Hypothesis 1 predicted a positive relationship between degree of positive slope of the control curve and departmental effectiveness; that is, departments with an egalitarian distribution of control were predicted to have higher output than departments with an hierarchical distribution of control. Hypothesis 2 predicted a positive relationship between total departmental control and departmental output. Hypothesis 3 predicted that distribution of control (slope) and total control would interact with each other and with department size in determining departmental output. Before testing these hypotheses, it was necessary to make some transformations on departmental publication data.

The original publication data consisted of raw numbers of each of seven classes of publications completed in each department for the years 1964 through 1968. Because the departments in the sample varied a great deal in size, raw numbers of publications would be highly dependent upon the size of the department. To correct for the effect of department size, the raw

numbers of each type of publication were divided by the number of faculty members in the department, resulting in per capita output scores.[2] An examination of the distributions of department per capita output scores revealed that the distributions were highly skewed right; that is, there were many departments with few outputs per faculty member and few departments with high per capita output. In order to provide distributions of scores more compatible with the assumptions of the analysis of variance, the per capita scores were transformed by a logarithmic transformation first used by Pelz and Andrews (1966) for a similar purpose. The transformation was of the form:

$$X_t = 1.0 + \log_e (X + 0.5), \qquad (1)$$

where X is the original score, and X_t is the transformed score. The 0.5 was added to the original score to avoid having to take a logarithm of zero, and the constant 1.0 was added to the logarithm to avoid the inconvenience of negative scores. Each of the following per capita output measures was transformed via equation (1): textbooks, monographs, articles, dissertations chaired, technical reports, book reviews, and other publications.

Significant F-ratios from the analysis of departmental outputs by control structure are presented in Table 1. The relevant cell means are presented in Table 2. The relationship between control structure and departmental outputs was significant at the .05 level or better for three departmental outputs. Main effects of total control and control slope will be discussed first, followed by a discussion of interactions.

Insert Tables 1 and 2 about here

TABLE 1

Relationships between Control Structure

and Departmental Outputs

Variable	Factor[a]	F	P	% Var.
Journal Articles	B	13.77	.001	27
	AxB	5.20	.05	10
Other Publications	B	5.47	.05	14
Dissertations	AxB	6.08	.05	14

[a]Factor A = control slope
Factor B = total control

TABLE 2

Cell Means for Departmental Outputs

Variable		Cell Means	
Journal Articles		Low Total Control	High Total Control
	Hierarchical	2.50	1.42
	Egalitarian	1.89	1.63
		2.19	1.52
Quality of Journals Index		Low Total Control	High Total Control
	Hierarchical	4.19	4.00
	Egalitarian	3.90	4.15
Other Publications			
	Hierarchical	.49	
	Egalitarian	.40	
	Low Total Control	.39	
	High Total Control	.50	
Dissertations Chaired		Low Total Control	High Total Control
	Hierarchical	1.42	.96
	Egalitarian	1.02	1.14

Main effects. There were significant main effects of total control for two output variables, log per capita journal articles and log per capita "other" publications. The means for the main effect of total control on per capita journal articles reveal that the relationship was in the opposite direction of that predicted by Hypothesis 2; departmental output of journal articles was negatively related to total control. This main effect accounted for 27% of the variance in log per capita journal articles.

The main effect of total control on "other" publications was in the predicted direction, however. Total control in the department was positively related to production of "other" types of publications. As was pointed out in the previous section, this category of publications consisted primarily of edited books, with the addition of a few published poems and short stories. There were no main effects due to distribution of control.

Interactions of total control and slope. There was a significant interaction between total control and slope of the control graph for two output variables: log per capita journal articles and log per capita dissertations. From examination of the cell means for these interactions in Table 2, one clear pattern emerges; in departments for which there is an hierarchical distribution of control (low slope), there is a negative relationship between total control in the department and output; the higher the total control, the lower the output. This negative relationship between total control and output was substantiated in tests of simple main effects of total control for hierarchical departments for both log per capita journal articles ($t = 3.95$, d.f. = 17, $p < .002$) and for log per capita dissertations chaired ($t = 2.53$, d.f. = 17, $p < .05$).

In departments with an egalitarian distribution of control, the negative relationship between total control and output did not occur. None of the tests of the simple main effect of total control on output for egalitarian departments reached an acceptable level of significance. It appears from these results that whatever disadvantages arise from a high amount of total control in a department are overcome if the control in the department is distributed in an egalitarian fashion among tenured and nontenured faculty members.

These results are in support of Hypothesis 3. Total control and distribution of control do interact in their effects upon departmental outputs. Variation in either factor alone is apparently not sufficient information to predict variation in departmental output.

Interactions with department size. In the analysis of department outputs, no significant interactions occurred between aspects of control structure and department size. Therefore, that portion of Hypothesis 3 predicting interactions with department size was not supported.

In a further attempt to analyze the relationships between control structure and output, individual publication data were submitted to the same analysis of variance as were the departmental output data. Each individual faculty member was classified into the design according to the control structure and size of the department in which he had an appointment. In all, there were 1433 individuals included in the analysis. Because they were distributed unequally among the eight cells of the design, an unweighted means analysis was again employed. The individual level analysis was applied to each of nine variables: textbooks, monographs, articles, dissertations chaired, technical reports, book reviews, other publications, First Job Index,

and Quality of Journals Index.

For the first seven outputs listed, the distributions were once again highly skewed right; that is, many individuals had few publications, while relatively few individuals had large numbers of publications. Therefore, the same transformation was applied to these individual output scores as was used on the departmental output scores. This logarithmic transformation is defined by equation 1 above.

For the First Job Index, the analysis was performed only for individuals who had chaired at least one doctoral committee and had at least one student placed in a job, resulting in an N of 176 for this analysis. The Quality of Journals Index was computed only for individuals who had published at least one article in the five-year period of 1964 to 1968, resulting in an N of 735 for this analysis.

The significant F-ratios from the individual level analyses are presented in Table 3. The cell means associated with these results appear in Table 4. As can be seen from Table 3, there were a number of significant relationships between control structure and individual outputs. Although these relationships were highly reliable statistically, it can be seen that they accounted for only small portions of the variance in the output measures, with none exceeding five percent. It is important to keep this in mind when interpreting these results. Here again, main effects will be discussed first, followed by a discussion of interaction effects.

Insert Tables 3 and 4 about here

Main effects of control slope. Significant main effects of slope of the

TABLE 3

Relationships between Control Structure

and Individual Outputs

Variable	Factor[a]	F[b]	P	% Var.
Monographs	AxB	6.92	.01	<1
	AxBxC	6.80	.01	<1
Journal Articles	B	80.02	.001	5
	BxC	6.81	.01	<1
Technical Reports	A	13.77	.001	1
Book Reviews	A	8.12	.005	1
	AxC	12.59	.001	1
	AxBxC	11.82	.001	1
Other Publications	B	12.57	.001	1
Quality of Journals Index	B	6.96	.01	1
	AxB	9.10	.005	1
	BxC	8.53	.005	1

[a]Factor A = control slope
Factor B = total control
Factor C = department size

[b]F-ratios for all variables except QJI are for 1,1425 d.f. For QJI the F-ratios are for 1,727 d.f.

TABLE 4

Cell Means for Individual Outputs

Variable	Factor		Cell Means		
Monographs	AxB		Low total control	High total control	
		Hierarchical	.23	.21	
		Egalitarian	.08	.21	
	AxBxC	small departments			
			Low total control	High total control	
		Hierarchical	.33	.23	
		Egalitarian	.08	.29	
		large departments			
			Low total control	High total control	
		Hierarchical	.13	.18	
		Egalitarian	.08	.13	
Journal Articles	B, BxC		Small departments	Large departments	
		Low total control	2.14	2.07	2.10
		High total control	1.57	1.02	1.30
Technical Reports	A	Hierarchical	.14		
		Egalitarian	.26		
Book Reviews	A, AxC		Small departments	Large departments	
		Hierarchical	.37	.47	.42
		Egalitarian	.40	.16	.16

Table 4 (continued)

Variable	Factor	Cell Means		
Book Reviews	AxBxC	Small departments		
			Low total control	High total control
		Hierarchical	.43	.31
		Egalitarian	.28	.53
		Large departments		
			Low total control	High total control
		Hierarchical	.35	.59
		Egalitarian	.19	.14
Other Publications	B	Low total control	.04	
		High total control	.12	
QJI	B, AxB		Low total control	High total control
		Hierarchical	3.72	3.21
		Egalitarian	3.38	3.42
			3.55	3.31
	BxC		Small departments	Large departments
		Low total control	3.44	3.67
		High total control	3.46	3.17

control graph occurred for log technical reports and for log book reviews. For log technical reports, the cell means were in the direction predicted by Hypothesis 1. Individuals in departments with an egalitarian distribution of control produced more technical reports than did individuals in departments with an hierarchical distribution of control. The results for book reviews were in the opposite direction, however. There was a negative relationship between slope of the control graph and individual output of book reviews. Thus, it appears that the distribution of control in departments affects different types of outputs in different manners.

Main effects of total control. There were significant main effects of total control on individual output of journal articles and "other" publications, as well as for Quality of Journals Index. Total control had different effects on these variables. For log journal articles, the relationship between total control and individual output was negative. Individuals in departments with high total control produced fewer articles than did individuals in departments with low total control. This result is contrary to the prediction of Hypothesis 2 and is in accord with the relationship of total control to output of journal articles found at the departmental level. This individual level relationship is the strongest relationship found at the individual level, accounting for five percent of the variance in log journal articles.

For "other" publications, the results support Hypothesis 2, as did the same results at the departmental level. The higher the total control in the department, the higher the individual output of other types of publications.

For the Quality of Journals Index, the relationship between total control and output was again negative, contrary to Hypothesis 2. The higher the total control, the lower the individual Quality of Journals Index score.

Interactions of total control and slope. Significant interactions occurred between total control and control slope for two individual level variables, log monographs and Quality of Journals Index. For log monographs, the cell means for the AxB interaction indicate that in departments with an egalitarian distribution of control, there is a positive relationship between total control and output of monographs. There is apparently no relationship between total control and individual output of monographs in departments where the distribution of control is hierarchical.

The shape of the slope by total control interaction effect on individual Quality of Journals Index is consistent with a pattern that was observed at the departmental level; there was a negative relationship between total control and individual Quality of Journals Index for departments with an hierarchical distribution of control, while there was no relationship between total control and individual Quality of Journals Index for departments with an egalitarian distribution of control.

It is interesting to note that all but one of the significant interactions reported between total control and distribution of control at both the departmental and individual level had a similar pattern. The relationship between total control and output did not appear for departments with an egalitarian distribution of control, whereas for departments with an hierarchical distribution of control, this relationship was negative. This pattern was observed at the departmental level for output of articles and dissertations and for the Quality of Journals Index and at the individual for output of book reviews in small departments. The only instance for which this general pattern did not hold was for output of book reviews in large departments.

In general, then, it appears from this consistent pattern of results that a large amount of total control in a department is detrimental to the production of certain outputs, and that this detrimental effect of high total control is overcome if the control in the department is distributed in an egalitarian fashion among tenured and nontenured faculty members.

Interactions with department size. An outcome of the individual analyses, which did not occur at the departmental level, was a number of interactions between aspects of control structure and department size. Significant interactions between control structure and department size occurred for four individual output variables.

The three-way interaction between control slope, total control, and department size was significant for log monographs. Examination of the cell means for this interaction in Table 4 indicates that the slope by total control interaction effect on log monographs reported above was more pronounced for small departments than for large departments. There was much greater spread in cell means for small departments than for large departments.

For log journal articles, total control interacted significantly with department size. The cell means indicate that the negative relationship between total control and log journal articles was stronger for large departments than for small departments.

The significant interaction between control slope and department size for log book reviews reveals that the negative effect of slope on log book reviews occurred only in large departments. Thus, in large departments an egalitarian distribution of control resulted in lower production of book reviews than did an hierarchical distribution of control. Egalitarian and hierarchical departments did not differ in output of book reviews for small departments.

In addition to the two-way interaction between slope and department size, there was a significant three-way interaction for log book reviews. Table 4 displays this interaction as two-way interactions between slope and total control presented separately for small departments and large departments. These interactions between slope and total control fit the general pattern thus far observed only for small departments. There was a negative relationship between total control and output for hierarchical departments and a positive relationship between total control and output for egalitarian departments. In the large departments, the pattern was different. Here, there was a positive relationship between total control and output in hierarchical departments and no relationship in egalitarian departments. The reason for this departure from the general pattern is not clear.

Finally, total control interacted significantly with department size for QJI. Here, there was a negative relationship between total control and output in large departments, with no relationship between total control and output for small departments. This result, coupled with the interaction effect of slope and total control on QJI indicates that at least for QJI, performance is affected by total control in departments with an hierarchical distribution of control and in large departments. Furthermore, the relationship between total control and QJI for these departments is negative; the higher the total control, the lower the average individual QJI.

It is concluded that Hypothesis 3 has received considerable support from the results presented thus far. Several interaction effects of control slope and total control on output have been reported at both the departmental level and the individual level. Furthermore, at the individual level, aspects

of control structure were seen to interact significantly with department size, indicating that control structure has varying effects upon individual output, depending upon the size of the department.

Hypotheses 4, 5, and 6. Hypotheses 4, 5, and 6 dealt with the relationships between aspects of control structure and satisfaction and climate within the department. Hypothesis 4 predicted a positive relationship between the degree of positive slope of the control curve and satisfaction and climate. Hypothesis 5 predicted that satisfaction and departmental climate would be positively related to the total amount of control in the department. Finally, Hypothesis 6 forecast interactions between control slope and total control and between aspects of control structure and department size in affecting satisfaction and departmental climate.

The results of statistical tests of Hypotheses 4, 5, and 6 were clear: there was no relationship, either main effect or interaction effect, between departmental control structure and any measure of faculty satisfaction. Thus, these hypotheses failed to receive support from the data for this study.

Discussion

The results of the present study provide strong evidence for the importance of departmental control structure as a factor related to both departmental and individual output in university departments. A great deal of previous research has been conducted on the general problem of control processes on organizations (c.f., Tannenbaum, 1968). The present study was designed to extend the previous research and provided at least three innovations over previous studies: 1) It extended the research into a new setting, the university. 2) The study employed a statistical design which allowed for

tests of interaction effects of total control and distribution of control on outputs, as well as interactions between these control variables and department size in affecting departmental output. These interactions were not tested in previous studies, and they turned out to be the most interesting results of the present study. 3) Finally, the present study provided tests of the effects of departmental control structure on individual outputs as well as on departmental outputs. Previous studies had dealt primarily with organizational effectiveness.

The results of the present study indicated that the relationships between departmental control structure and other system variables in university departments are, at best, complex. This section will examine the main findings of the present study and will attempt to shed some interpretive light on these findings.

Relationships between Control Structure and Departmental Outputs

Three of the major hypotheses of the present study predicted specific relationships between departmental control structure and departmental output. Results of tests of these hypotheses will be discussed in this section.

1. Main effects of total control.

Hypothesis 2 predicted a positive relationship between total control and output. This relationship has been observed in a number of different types of organizations (Smith & Tannenbaum, 1963). Main effects of total control were observed at both the departmental level and the individual level for output of journal articles and "other" publications, and total control in the department was also significantly related to the Quality of Journals Index at the individual level. For output of journal articles at both the departmental level and the individual level and for the Quality

of Journals Index at the individual level, the relationship between total control and output was in the opposite direction of that predicted by Hypothesis 1; the higher the total control in the department, the lower the output. For "other" publications, the relationship was in the predicted direction.

Both quantity and quality of journal publications were, therefore, highest for departments with low total control. This negative relationship between total control and research output in university departments contrasts with a positive relationship between total control and output found in other organizations. This difference may be due to the nature of the research task. Research is conducted individually or in small groups, and there is relatively little interdependence among departmental faculty members with respect to research. It could be argued, therefore, that participation in departmental administration and decision-making requires of the faculty member a commitment of time and energy which could otherwise be devoted to research. Therefore, involvement in organizational control would detract from research output. By contrast, in organizations of the type studied by Tannenbaum, the final product or output is at the organizational level, requiring interaction and interdependence among individual members of the organization. In these organizations, individual involvement in organizational control enhances output.

2. Main effects of distribution of control.

Hypothesis 1 predicted a positive relationship between the degree of positive slope of the control graph and departmental output; that is, departments with an egalitarian distribution of control were predicted to have higher output than departments with an hierarchical distribution of

control. Statistically significant main effects of distribution of control occurred only at the individual level. For output of technical reports, the results supported Hypothesis 1; individuals in egalitarian departments produced more technical reports than did individuals in hierarchical departments. The results for output of book reviews, on the other hand, contradicted Hypothesis 1. The relationship between slope of the control graph and individual output of book reviews was negative.

Hypothesis 1, then, was generally not supported in the present study. This was not too surprising considering the comparative study of Smith and Tannenbaum (1963). In comparing the relationships between control structure and effectiveness across a number of different organizations, they found distribution of control to be related to effectiveness in only one type of organization, a voluntary organization. Thus, it appears that this main effect of distribution of control is not too general. The results of the present study indicate, however, that distribution of control may be an important mediator of the relationship between total control and organizational output.

3. Interactions.

The tests of the interaction effects of total control and distribution of control on departmental and individual output provided the most interesting and important results of the present study. For a number of output variables both at the departmental and individual level, a highly consistent pattern of results emerged: There was a negative relationship between the total amount of control in the department and departmental and individual output in departments which had an hierarchical distribution of control (i.e., departments in which tenured faculty members participated more in

departmental administration than did nontenured faculty members). When the distribution of control between tenured and nontenured faculty members was egalitarian, on the other hand, there was no relationship between total control and output. Thus it appears that at least for university departments, the way in which control is distributed among members of the organization will determine the effect of the total amount of control in the organization on effectiveness. This proposition clearly deserves empirical tests in other types of organizations.

Finally, at the individual level, the size of the department was found to enter into interactions with control structure in affecting output. For individual output of monographs and book reviews, department size appears to have mediated the interaction effect of distribution of control and total control, with the interaction effect being more pronounced for small departments than for large departments. For output of journal articles, the negative relationship between total control and individual output was stronger for large departments than for small departments. These results support the prediction of Hypothesis 3 that department size would interact with control structure in affecting output.

Relationships between Control Structure and Satisfaction

A very consistent finding that has appeared a number of times in the literature on organizations is that the amount of control or influence a person feels he has in an organization is positively related to his satisfaction with his job or task (Smith & Tannenbaum, 1963; Tannenbuam, 1962; Vroom, 1960; Bachman & Tannenbaum, 1966). The results of the present study showed no significant relationship between the control structure of university departments and faculty satisfaction with various aspects of the

job situation. If these results are valid, they mark an important difference between universities and other types of organizations.

There is some reason to believe that the amount of influence or control an individual has in a university department would not be related to his job satisfaction. It is common lore that university faculty members derive personal satisfaction from individual scholarly effort rather than from accomplishments of the department as a whole. Thus, participating in departmental affairs is less likely to be rewarding or satisfying to a university faculty member than it would be for a factory worker.

Comparison to Previous Studies

To conclude from the results of this study that control structure-output relationships are different for university departments than for other types of organizations would be premature, because the present study differs from the studies reported by Tannenbaum and his associates in at least three important ways. First, there is the difference in setting. To the knowledge of the author, this is the first study to investigate the relationships between control structure and output variables in university departments. As was pointed out in the first chapter, universities differ from other organizations in many important ways, and these differences require systematic treatment in order to identify critical differences.

Secondly, the measure of control used in this study differed from that used by Tannenbaum and others. Their measure has typically consisted of ratings by members of the organization of the amount of say or influence that each of several hierarchical levels of the organization has over what goes on in the organization. The measure of control used in the present study required faculty members to rate their own degree of participation in departmental administration and decision making. It is possible that

these two measures tap somewhat different processes of control.

An important limitation of the measure of control used in the present study was that it tapped only one source of control, namely participation in departmental administration. A more comprehensive measure of control or influence in a social system should take into account other sources of influence as well, such as legitimate or formal power, informal interpersonal relationships, assignment of individuals to a large number of positions, and the structure of the task system. O'Brien, Biglan and Penna (1961, in press), have developed a structural approach to the measurement of influence in an organization which takes into account all of these sources of influence. This type of approach to the measurement of control or influence should be encouraged, because it takes into account the complexities of the social system under study.

Finally, in the previous studies, the distribution of control was measured among different levels of relatively formal authority hierarchies. In the present study, the distribution of control between tenured and nontenured faculty was measured. Academic rank in a university department represents more of a status hierarchy than a formal authority hierarchy, so caution is required in comparing results of this study with results of previous studies.

In order to determine more adequately the similarities and differences in control processes between university departments and other types of organizations, more systematic research is needed in which the factors discussed above are varied one at a time.

Summary and Implications

Summary

A considerable amount of research, reviewed by Tannenbaum (1968), has

focused on the relationships between control processes and effectiveness in a number of different types of organizations. These studies have dealt with two aspects of the control structure of organizations: the total amount of control in the organization and the distribution of control among various hierarchical levels of the organization. Their results have shown a fairly consistent positive relationship between the total amount of control in the organization and organizational effectiveness and member satisfaction. A less consistent finding has been that the distribution of control in the organization is related to effectiveness, such that organizations with a democratic or egalitarian distribution of control among hierarchical levels are more effective than organizations in which the distribution of control is hierarchical.

The present study extended this work into a novel setting, the university. The control structures of 37 academic departments of the University of Illinois were characterized in terms of two variables: 1) the total amount of control exercised by faculty members in the department; and 2) the distribution of control in the department between tenured and nontenured faculty members. Control was measured by self reports by faculty members of their own degree of participation in departmental administration and decision making.

Tests of the main hypotheses of the study revealed two very important results. The first of these was a highly consistent pattern of interaction effects of total control and distribution of control on departmental and individual outputs. In departments in which control was distributed in an hierarchical fashion (i.e., tenured faculty members had more control in the department than nontenured faculty members), there was a negative relationship

between total control in the department and output. This negative relationship is contrary to the positive relationship in other organizations reported by Tannenbaum (1968). In departments in which the distribution of control was egalitarian, there was no relationship between total control and output. Thus, distribution of control appears to be important not in its main effects, but rather in its mediation effect on the relationship between total control and output.

The second important finding was that the control structure of university departments was unrelated to faculty satisfaction with various aspects of the job situation. This result contradicts a rather substantial literature concerning the relationship between control and satisfaction in organizations.

Practical Implications

The results of the present study have important practical implications for the organization of university departments. It appears to be very important for university administrators to consider the way in which control in academic departments is distributed among faculty members. The results of the present study indicate that the distribution of control has important consequences for the relationship between the total amount of faculty participation in departmental administration and subsequent output. The results further indicate that at least research output is facilitated by low faculty participation in departmental administration. Further research is needed to assess the effects of control structure on teaching outputs.

Two notes of caution must be sounded at this point. First, the present study was conducted at a large, state-supported institution, which

places great emphasis on graduate education. Whether the results can be generalized to other types of colleges or universities is a question for further research.

Secondly, the output variables used in this study represented "normative" or standard outputs of university departments. If a department is primarily concerned with other types goals, such as innovation, or religious education, or practical applications of knowledge to the social problems of the day, then the results of the present study possibly do not apply.

Implications for Theory

The theoretical implications of the present study are important not only for theories about university organizations, but for organizational theory in general. One very important finding of this study was the interaction effect of total control and distribution of control on departmental and individual output. Smith and Tannenbaum (1963) report that the distribution of control had a main effect on organizational output in only one organization of the several that were surveyed. The present results indicate that the distribution of control is potent in its mediation effect on the relationship between total control and organizational effectiveness. The generality of this relationship across organizations should clearly be assessed.

A further result of considerable theoretical importance is the lack of relationship between departmental control structure and faculty satisfaction. This may reflect less commitment to organizational matters and more commitment to individual effort for university faculty members than for members of other types of organizations. This may highlight at least one of the critical differences between universities and other types of organizations.

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Footnotes

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2. Dividing by department size is not a linear transformation, so it was still possible for department size to correlate with the output measures used. Examination of the correlations between department size and each of the transformed outputs revealed that none of the correlations differed significantly from zero.